Installation Guide
Tracer® Ensemble™

⚠ SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

December 2024

BAS-SVN024H-EN

Introduction

Read this manual thoroughly before operating or servicing this unit.

Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
NOTICE	Indicates a situation that could result in equipment or property-damage only accidents.

Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

⚠ WARNING

Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury.

All field wiring MUST be performed by qualified personnel. Improperly installed and grounded field wiring poses FIRE and ELECTROCUTION hazards. To avoid these hazards, you MUST follow requirements for field wiring installation and grounding as described in NEC and your local/state/national electrical codes.

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⚠ WARNING

Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- **Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.**
- **When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.**
- **If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

⚠ WARNING

Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- **All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.**
- **Non-Trane personnel should always follow local regulations.**

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Factory Training

Factory training is available through Trane University™ to help you learn more about the operation and maintenance of your equipment. To learn about available training opportunities contact Trane University™.

Online: www.trane.com/traneuniversity

Email: traneuniversity@trane.com

Revision History

- Updates to the System Requirements and Specifications section .
- Updates to Windows Server versions.
- Updated and expanded the list of supported web browsers.

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System Requirements and Specifications

Server Requirements

Operating System:	Microsoft Windows Server 2016, 2019, 2022
	.NET 4.7.2
Database:	Microsoft SQL Server 2014, 2016, 2017, 2019, 2022
	*SQL 2022 Required for BACnet® Secure Connect
Network Interface:	TCP/IP

Minimum Requirements:

Configuration	Server Type	Processor	Memory	Hard Drive
Application server	Virtual[a]	2 vCPU[a]	8 GB	NAS/SAN
Application server	Tower or rack-mount	3.0 GHz - 4 Core	8 GB	73 GB Min
Application server with SQL database	Tower or rack-mount	3.0 GHz - 4 Core	8GB/16GB+[b]	
Ensemble Cloud	Custom Web address, backed by Amazon, no upgrade limits			

Note: Ensemble Cloud is hosted in the Amazon Web Services® (AWS®) environment. Each customer is assigned their own virtual web and application server. Tracer® Ensemble installations can transition from an installation On-Premises Server to AWS and vice-versa. Tracer Ensemble Cloud is a Software as a Service (SaaS) solution where Trane takes consistent care of system upgrades and backups.

BACnet® Network Requirements

Architecture:	TCP/IP
Utilization:	Low
Protocols:	BACnet® (ASHRAE Std 135-2004)
	http (port 80)

User Interface Network Requirements

Tracer® Ensemble Web UI:	http (port 80)
	https (port 443)[c]
	BACnet/SC (TCP Port 47808)
Server:	Remote Desktop Connection[d] (RDP) port 3389
	VPN recommended
Utilization:	Load dependent on number of users and web page customizations

[a] Virtual Server needs to be configured to allow the Processor Serial Number (Processor ID) to be persisted. This is used by Tracer® Ensemble for licensing purposes.
[b] Medium-large sites should consider using 16GB+ of memor (RAM).
[c] Https requires additional configuration and installation of certificate.
[d] Remote desktop connection is recommended for support; additional configuration is needed for RDP and VPN.

SQL Database Size

The size of the SQL database Tracer® Ensemble uses will depend directly upon on:

- How much equipment is being monitored.
- The number of points on each piece of equipment.
- The frequency of data logs being captured.
- The length of time data logs are kept.

The following tables approximates the size of the Tracer Ensemble SQL database to grow given 200, 500, and 1000 pieces of equipment over 1 and 3 years.

200 Equipment 5 points each	**1 Year of Data**	**3 Years of Data**
15 min	3.51 GB	10.53 GB
10 min	5.27 GB	15.8 GB
5 min	10.5 GB	31.6 GB

500 Equipment 5 points each	**1 Year of Data**	**3 Years of Data**
15 min	8.78 GB	26.3 GB
10 min	13.2 GB	39.5 GB
5 min	26.33 GB	79.0 GB

1000 Equipment 5 points each	**1 Year of Data**	**3 Years of Data**
15 min	17.56 GB	52.67 GB
10 min	26.33 GB	79 GB
5 min	52.67 GB	158 GB

Configure Microsoft Windows Server

Important: *Beginning with Tracer® Ensemble 5.1, the application will automatically configure these roles and settings during the installation process. Follow these instructions if installing an older version of Tracer Ensemble or to verify a setting.*

Initial System Configuration

This subsection provides steps for setting up a new server running Window Server Standard OS on which you plan to run Tracer® Ensemble software with a local SQL database. The instructions assume that the server operating system is a fresh out-of-box installation and is being powered up for the first time. Skip any steps that have already been completed for this server.

Information Needed

Important: *Your Windows Server Operating System must not be configured as a domain controller. Applying the domain controller role prevents installing Tracer® Ensemble on that server.*

Before you begin the configuration, get answers to the following questions from your IT organization:

- What IP address, Subnet mask, and Default gateway will the server use?
- What is the network name and workgroup or domain name (if applicable) of the server?

Network and Regional Settings

To configure the server:

1. Power up the server with all of the peripherals connected.
2. Set the new Administrator password and record it in a safe location. The Initial Configuration Tasks window appears.
3. Click **Set time zone**, and then complete the time zone and date and time settings according to your region.
4. Click **OK**. You will return to the Initial Configuration Tasks window.
5. Click **Configure networking**, and then complete the following steps:
   a. Double-click **Local Area Connection**.
   b. In the Local Area Connection Status window, click **Properties**.
   c. On the Networking tab, double-click **Internet Protocol Version 4 (TCP/IPv4)**.
   d. In the Internet Protocol Version 4 (TCP/IPv4) Properties window, select **Use the following IP address**, and then type in each of the three addresses provided by the IT organization. If you do not know the correct IP Address, you can temporarily use 172.16.1.82 or any other private address.
   e. Click **OK**. You will return to the Local Area Connection properties.
6. Click **OK**. You will return to the Initial Configuration Tasks window.
7. Click **Provide computer name and domain**. The Computer Name tab on the System Properties window appears.
8. Optionally, type a description in the **Computer description field**.
9. Click **Change**. The Computer Name/Domain Changes window appears.
10. Replace the text in the Computer name with the computer name provided by the IT organization.
11. Click **OK**, and then reboot the server. Upon reboot, you return to the Initial Configuration Tasks window.
12. Click **Provide computer name and domain**. The Computer Name tab on the System Properties window appears.
13. Click **Change**. The Computer Name/Domain Changes window appears.
14. Select **Domain** or **Workgroup** with the information provided by the IT organization.
15. Click **OK**, and then reboot the server. Upon reboot, you return to the Initial Configuration Tasks

window.

16. Click **Close**.

Roles and Services

Tracer® Ensemble requires features of the server operating system to be installed to operate correctly. Each server version is slightly different in the setup and configuration of these features. The summary of these features are:

Windows Server Roles

Application Server Role Services:

- .Net 4.72
- .Web Server (IIS) Support

Web Server (IIS) Role Services:

Common HTTP Features

- Default Document
- Directory Browsing
- HTTP Errors
- Static Content
- Health and Diagnostics
- HTTP Logging
- Logging Tools
- Request Monitor
- Performance (all)
- Security
- Request Filtering
- Performance
- Static Content Compression

Application Development

- .Net 4.72
- ISAPI Extensions
- ISAPI Filters
- Management Tools
- IIS Management Console
- IIS Management Scripts and Tools
- IIS Management Compatibility (all)

.Net Framework

Tracer® Ensemble requires .Net 4.7.2 to be installed on the server and will do this automatically during the installation process. If the server does not have an Internet connection, .Net will need to be downloaded manually and installed manually separately.

Installation and Configuration on non-Latin Based Servers

This section covers known issues with installation and configuration on a non-Latin based server, including, but not limited to: Chinese, Japanese, Korean, and other complex script languages.

Tracer Ensemble Installation

Installing Tracer® Ensemble on a non-Latin based server requires special handling of the current SQL scripts that are used for database creation and updates:

1. Create the database in Latin-based script language.
2. Change the language for non-Unicode programs complex script display language to English.
3. Run the appropriate SQL scripts that are needed.
4. Revert the language for non-Unicode programs from English to the complex script display language of choice.
5. Install the Tracer Ensemble application.

Install and Configure SQL Server

See Microsoft Developers Network (MSDN) article 143219 for complete installation instructions and configuration.

Database Setup

These procedures must be performed before installing Tracer® Ensemble. Before you begin, verify the following:

- You have a supported version of Microsoft SQL Server installed on your system.
- You have a Tracer Ensemble installation media.
- You are not performing an upgrade of Tracer Ensemble. These instructions apply only to a new database.

Note: *These procedures and the screen captures used are based on an older Windows Server and SQL Server version. There may be slight, undocumented differences between your installation and the installation shown if you are using a different database or operating system. See Appendix B: Advanced SQL Configuration for further details on advanced configuration.*

Create the Database

To create the database:

1. Click Start | All Programs | Microsoft SQL Server| **Microsoft SQL Management Studio**.
2. In the **Connect to Server** window, complete the following tasks.
   a. In the Server type field, select **Database Engine**.
   b. In the Server name field, select the name of the database server (typically the name of the server you are using).
   c. In the Authentication field, select **Windows Authentication**.
   d. Click **Connect**.
3. Under Object Explorer, right-click Databases and select **New Database**.
4. In the New Database window, complete the following tasks:
   a. In the Database name field, enter **Tracer Ensemble**.

      Note: *You can choose any name you like for the database, but this procedure and the screen captures in this document will use **Tracer Ensemble** as the database name. If you choose a different name, substitute your database name where appropriate.*

   b. Click **OK** (*not* Add, which would begin to create another new database).
5. Navigate to the newly created database to verify that it has been added.

Upon completion of these steps, the database shell is created, but its structure and Tracer Ensemble initial values are not yet in place.

Create the Database Structure

The database structure is provided on the installation disk. Complete the following procedure to apply the structure to your database:

1. Select File | Open | **File...**.
2. Locate and open the **TracerEnsemble.db.create.sql** file in the **DBScripts** directory at the top level of the Tracer Ensemble installation media. (Reconnect to the database engine, if prompted, to proceed.).
3. Select the **Tracer Ensemble** database.
4. On the Query menu, click **Execute**.
5. In the Object Explorer sidebar, expand the Tracer®Ensemble database, and then expand **Tables**. There should be a list of tables starting with dbo.

Populate the Database with Initial Values

The initial values for the Tracer® Ensemble database are provided on the installation disk. Complete the following procedure to apply the initial values to your database:

1. On the File menu, select Open | **File...**.
2. Locate and open the **TracerEnsemble.initial.data.sql** file in the **DBScripts directory** at the top level of the Tracer® Ensemble installation media. (Reconnect to the database engine, if prompted, to proceed.).
3. Select the **Tracer Ensemble** database.

   Note: *Step 3 is easy to miss. Be sure that the newly created database appears in the pull-down menu.*

4. On the Query menu, click **Execute**.
5. In the Object Explorer sidebar, expand the Tracer Ensemble database, and then expand **Tables**. There should be a list of tables starting with dbo.
6. After executing the two database scripts, the database tables should appear as in Figure 22. To perform this check:
   a. Expand **Tables**.
   b. Right-click **LOV_TimeZone** table, and then select **Select Top 1000 Rows**. You will see time

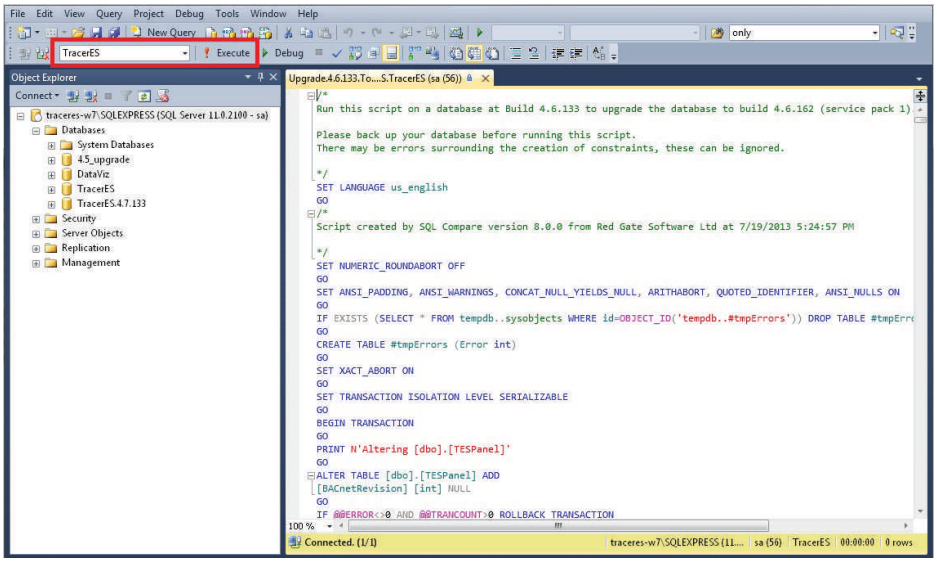
zone data in the lower right quadrant of the window as in. If the scripts were not executed properly, the table will either not be available or will not contain any data.

If the table is not available or does not contain any data, go back and re-execute the scripts.

Manually Upgrading the Tracer Ensemble Database

1. Determine the current version of Tracer® Ensemble. In Tracer Ensemble navigate to Actions and Settings | System | **System Status**. The build will be represented as X.X.XXX. This is required to update the database manually.
2. Open SQL Server Management Studio.
3. Log in with the appropriate user account.
4. Within the Object Explorer, expand **Databases** and locate the database that is currently being used by Tracer Ensemble. This can be determined by the Tracer Ensemble Smart Client.
5. Within the Tracer Ensemble installation media, open the **DBScripts** folder.
6. Using the current version of Tracer Ensemble located in the first step:
   a. Locate the Upgrade.X.X.XXXto.Y.Y.YYY.sql or Upgrade.X.X.XXXto.Y.Y.Current.sql script, where **X.X.XXX** is the current version. **Y.Y.** indicates the next available version. Double click on this to open the script in SQL Server Management Studio.
   b. Select the database that you want to apply the script to. Click **Execute**.

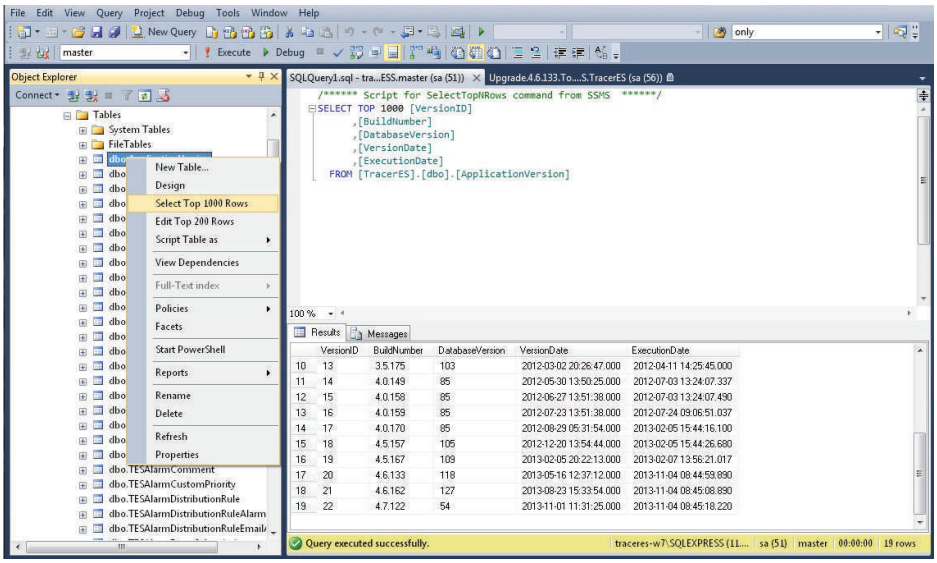
Figure 1. SQL Server



   c. Execute all scripts (starting with the script selected in step a) in order until the Upgrade.X.X.XXX.to.Y.Y.Current.sql is run.

   Example: Your current Tracer Ensemble system is 4.6.133. To upgrade to 4.7 (current software), Upgrade.4.6.133.to.4.6.162.sql then Upgrade.4.6.162.to.4.7.Current.sql SQL scripts must be run.
7. If an error has occurred during the running of the script, no changes will be committed to the database. Contact Technical Support for assistance.
8. To verify the upgrade of the database, expand the **Tracer Ensemble Database**, expand **Tables**.
9. Right click on dbo.ApplicationVersion and select **Select Top 1000 Rows**. Scroll to the bottom of the results to verify the correct version has been entered into the table.

Figure 2. Database Version Table



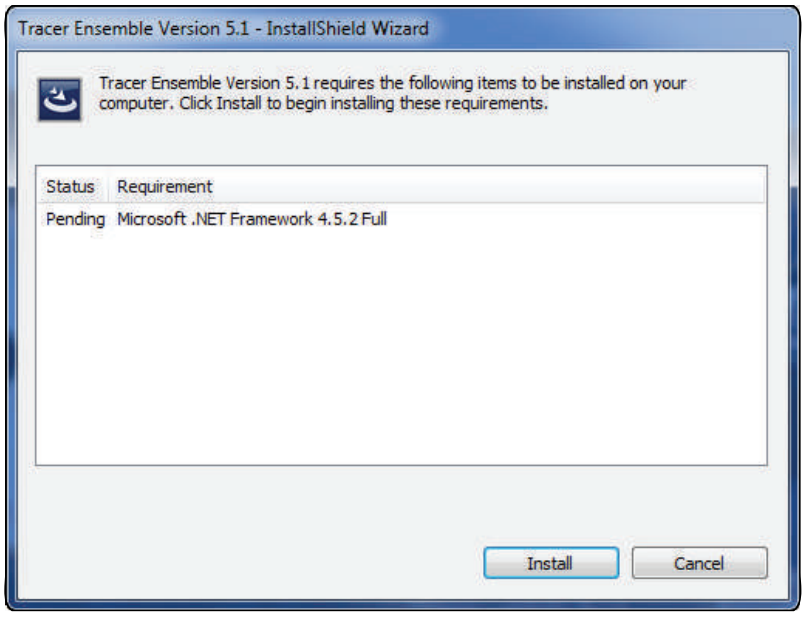
Install Tracer Ensemble Application

1. Load the Tracer® Ensemble installation media and wait for the Autorun program. If Autorun does not being automatically, browse to **My Computer**, right click on the disk drive, and select **AutoPlay.**
2. The installer will determine if the correct .Net Framework is installed. If the correct version is not installed, the Tracer Ensemble installer will download and initiate the .Net Framework installer.

   Note: *If Internet access is not available to the server, a manual download and installation of .Net Framework is required. Tracer Ensemble 4.7+ will not install if the correct framework is not in place.*

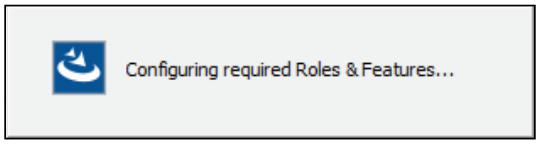
   a. When prompted, install the .Net Framework version.

Figure 3. Tracer® Ensemble Installer .Net Update



   b. Upon installation of the .Net Framework, the Tracer Ensemble installer will proceed with installation.

Figure 4. Configuring Roles and Features



3. On the welcome screen, click **Next**.

4. On the Installation Type screen, select your desired method for installing Tracer® Ensemble:
   - Select **Install Tracer Ensemble and create database** if the SQL Server resides on the same server or SQL Server administrative credentials are available. With this option, the installation program will create the database and install Tracer Ensemble.
   - Select **Install Tracer Ensemble only** if the SQL Server is managed by a Database Administrator, or administrative credentials are not known. With this option the installation program will only install Tracer Ensemble; database creation and script execution have to be done manually.

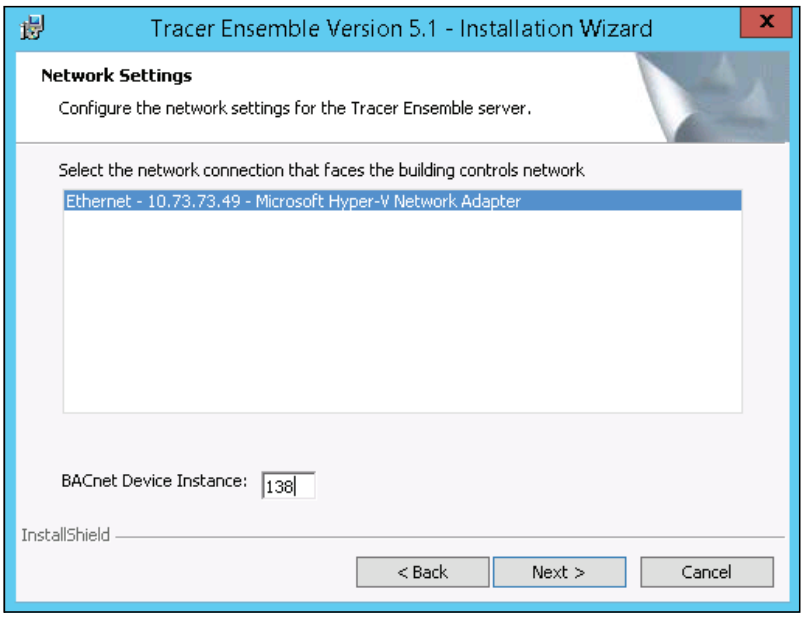
5. On the Custom Setup screen, select the languages you want to install, and then click **Next**.

6. On the Customer Information screen, complete the fields according to your preferences, and then click **Next**.
   - **User Name** is usually the name of the customer who owns or administers the software.
   - **Organization** is usually the company, agency, or other organization that owns the software and the building network.

7. On the Destination Folder screen, accept the default destination folder (recommended) or select a different folder by clicking **Change** and specifying a different folder. Then click **Next.**

8. On the Network Settings screen, select a network connection, specify the BACnet® Device Instance, and then click **Next**. Here is some additional information:
   - The network connection is identified by its connection name, IP address, and the name of the network interface adapter installed.
   - The **BACnet Device Instance** is a unique number that the BACnet network uses for routing alarms from Tracer Summit to Tracer Ensemble. Device instance 125 is the default and should be used unless already used.

Figure 5. Network Settings



9. On the Database Settings screen, complete the fields according to the Tracer Ensemble database and click **Next**.
   - If **Install Tracer Ensemble and create database** has been selected:
     - **Database Server** is the server name of the SQL server computer. If you are not sure of the name, open the SQL Server Management Studio. The server name is shown on the Connect to Server window. If the SQL Server Management Studio is already running the server name is at the top level of the navigation tree, and on the title of the database when selected. The database server name may also contain the SQL instance name if the default instance is not used.
     - **Database Name** will be the name of the database to be created, Tracer Ensemble should be used unless otherwise noted by Database Administrator or customer request.
   - If **Install Tracer Ensemble** has been selected:

  - **Database Server** is the server name of the SQL server computer. If you are not sure of the name, open the SQL Server Management Studio. The server name is shown on the Connect to Server window. If the SQL Server Management Studio is already running the server name is at the top level of the navigation tree, and on the title of the database when selected.
  - **Database Name** is the name of the Tracer Ensemble database. It should be Tracer Ensemble unless the database creator chose a different name during the setup.

- **Authenticate connection**
  - Select **Windows authentication...** to use your Windows login credentials to authenticate your access to the Tracer Ensemble database. Choose this option if you are typically able to make changes to the database structure without needing to login using a different administrator account.

    If **Install Tracer Ensemble and create database** was selected, the installation program will construct the database using the Windows credentials. The Tracer Ensemble system will access the database using the following SQL username and password:

    Username: tranedbuser

    Password: tes!2345

    If **Install Tracer Ensemble** was selected, the Tracer Ensemble system will access the database using the Windows credentials of the current user.
  - Select **Server authentication...**, and then specify the **Login ID** and **Password** to be used to log in to the database. Choose this option if you know that you need to use a different administrator account to and make changes to the database.

    If **create database** was selected, the entered SQL user is required to have either DbOwner or SysAdmin role for the installation to execute successfully. The installation program will construct the database with the specified SQL user credentials. Tracer Ensemble will access the database using the following SQL username and password:

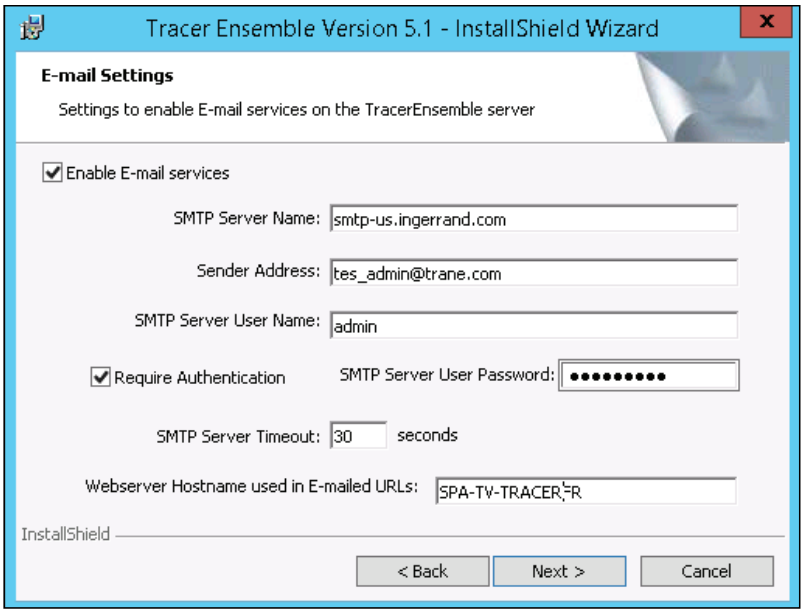
    Username: tranedbuser

    Password: tes!2345

    If **Install Tracer Ensemble** was selected, the Tracer Ensemble system will access the database using the specified SQL credentials.

10. On the E-mail Settings screen, complete the fields according to your e-mail system and click **Next**.
    - If you *do not* want to use e-mail notification from Tracer Ensemble, clear **Enable E-mail services**. The rest of the screen can be ignored.
    - If you *do* want to use e-mail notification, select **Enable E-mail services** and complete the rest of the screen with information about the e-mail account you will use. These settings are the same as you would find in setting up any local e-mail client. The e-mail service provider, whether internal or external, must have created the account and should be able to provide the necessary information.

Figure 6. E-mail Settings



11. On the Ready to Install screen, select or clear an option as desired, and then click **Next**.
    - Select **Start Application Server when complete** if you would like to run the Tracer Ensemble server as soon as installation is complete.
    - Clear **Start Application Server when complete** if you prefer to start the server manually after installation.
12. Wait for the installation to complete.
13. When the InstallShield Wizard Completed screen appears, click **Finish**.

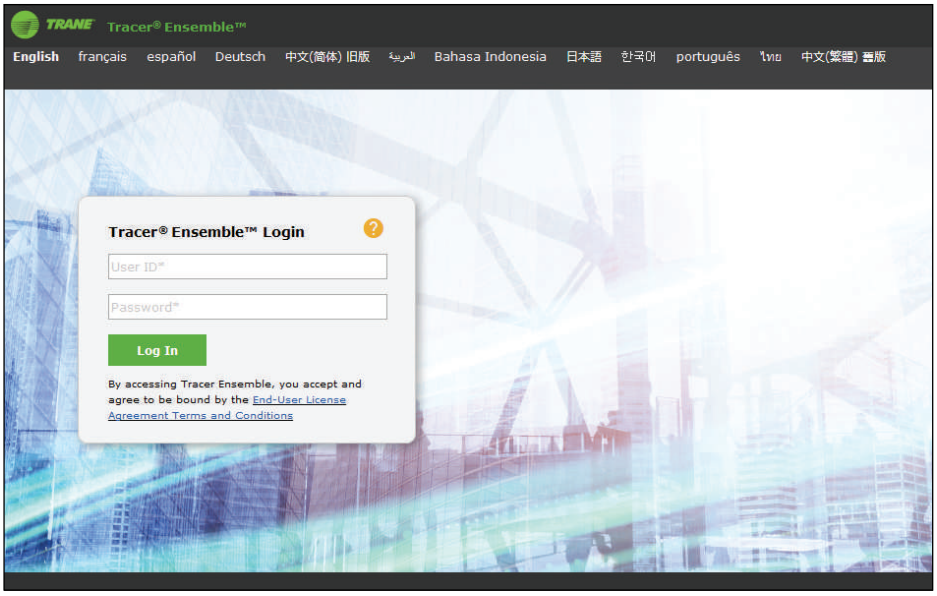
Tracer Ensemble First Login

Use the built-in administrative account to log in to Tracer® Ensemble for the first time. This will confirm that the server is running as expected.

To log in to Tracer Ensemble:

1. Open one of the following web browsers:
   - Microsoft Edge
   - Google Chrome
   - Mozilla Firefox
   - Apple Safari.
2. In the browser **Address** field, type in the address of the Tracer Ensemble server. If you are logging in on the same computer where Tracer Ensemble is installed, use **http://localhost/***Virtual Directory Name* (For example, most installations by default will be http://localhost/Tracer Ensemble).The Tracer Ensemble login page appears.
3. Select an alternate language, if needed, by clicking the button for the desired language. There are some additional regional settings you can change if you edit your preferences.
4. Enter Trane for **User ID**; Tracer for **Password** and click **Login.**

Figure 7. Tracer® Ensemble Login Page

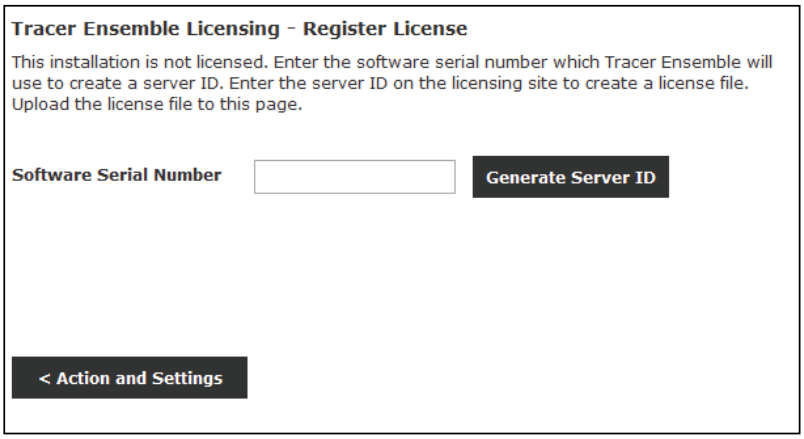


5. Read the license agreement. You must scroll to the bottom of the agreement.
6. Click **Yes, I do accept** and **Continue** to indicate your acceptance of the agreement. The Tracer Ensemble Home page appears.

Licensing

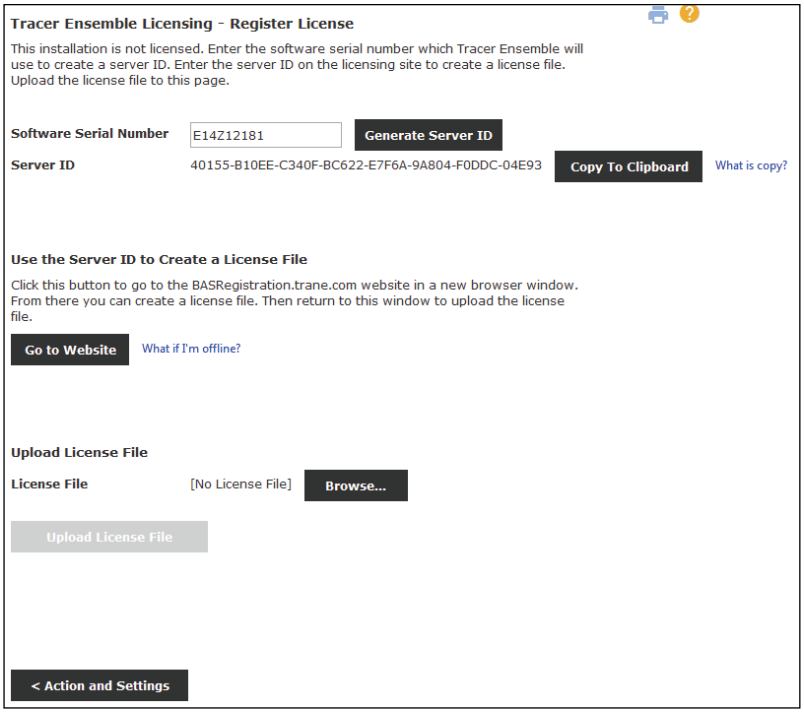
1. Select Actions and Settings | **Tracer Ensemble Licensing**.
2. Enter the **Software Serial Number**.

Figure 8. Enter Software Serial Number



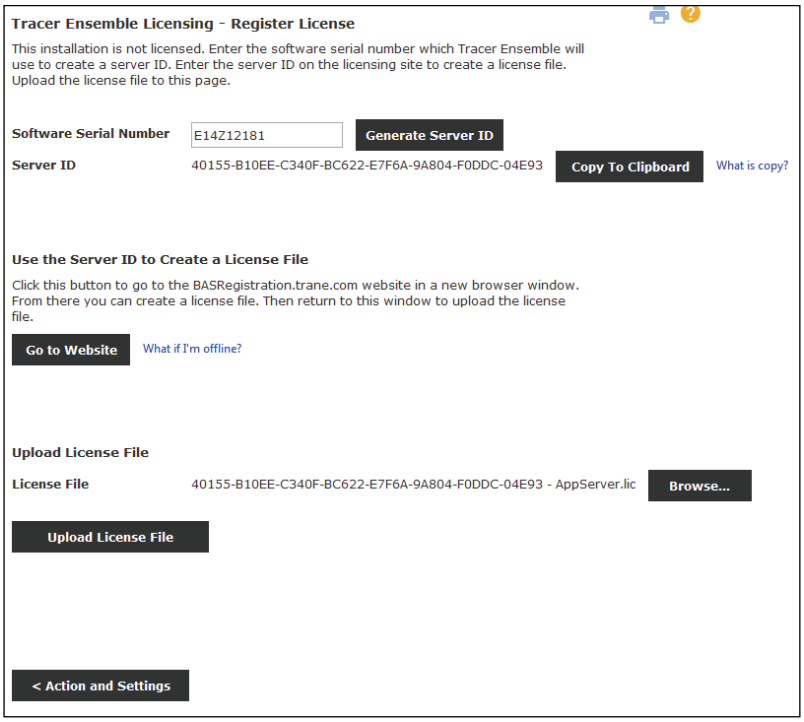
3. Click **Generate Server ID**.

Figure 9. Generate Server ID



4. Click **Copy to Clipboard** to copy the Server ID to your clipboard.
5. Click **Go To Website** to create a license file.
6. Once you have created a license file, click **Browse** and select the license file.
7. Click **Upload License File**.

Figure 10. Upload License File



SAML SSO Setup

Tracer® Ensemble SAML feature is an optional, licensed feature that allows Tracer Ensemble users to use their organization email address and domain password to log in.

SAML (Security Assertion Markup Language) is an open standard that enables users to access multiple web applications with single sign-on (SSO). Security credentials (username and password) can be shared and verified from an Identity Provider to Tracer Ensemble.

System Requirements

- Tracer® Ensemble Version 6.3 or later.
- SAML SSO license must be applied to Tracer Ensemble.
- Configuration of Tracer Ensemble within the Identity Provider (Ping Identity, Okta, Azure, etc.) must be completed first.

Setup Requirements

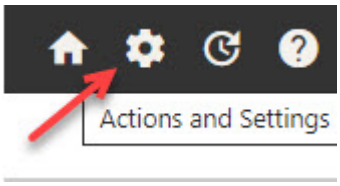
All users must have a Tracer® Ensemble User Account before they can log in with SAML. This SAML SSO functionality only includes authentication of the user, not authorization. If a user is given access to Tracer Ensemble application within their Identity Provider, they must also have an existing Tracer Ensemble user account. If they do not have an existing Tracer Ensemble user account, you must create a user account for them to log in and authenticate via SAML.

Verify SAML License

To verify the SAML license:

1. Select **Actions and Settings** from the top right banner.

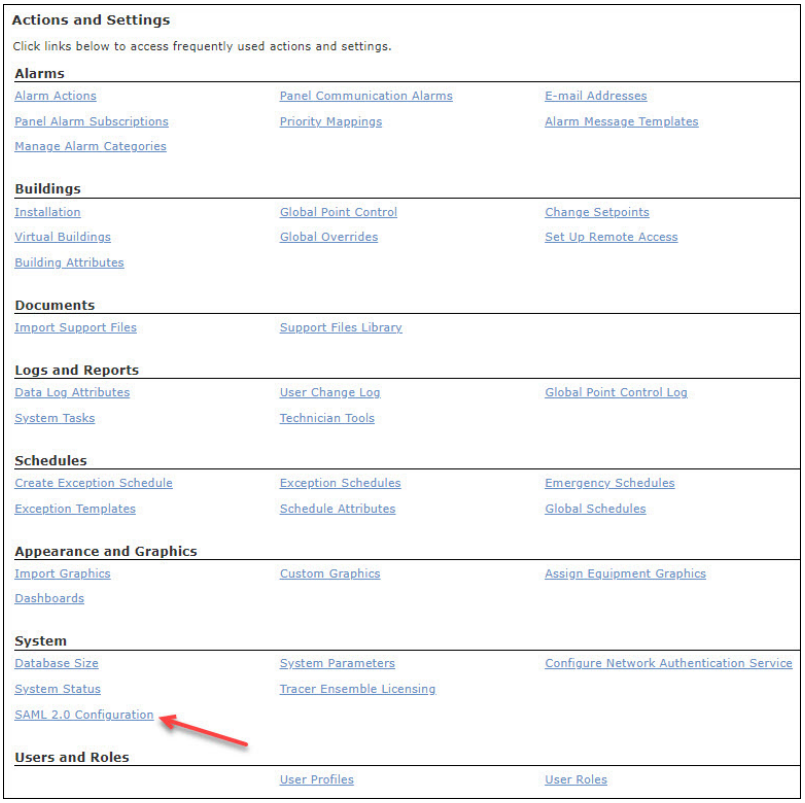
Figure 11. Actions and Settings



2. Verify that **SAML 2.0 Configuration** displays under System.

Note: *SAML 2.0 requires an additional license. If it does not display under System, upload the license again.*

Figure 12. SAML 2.0 Configuration

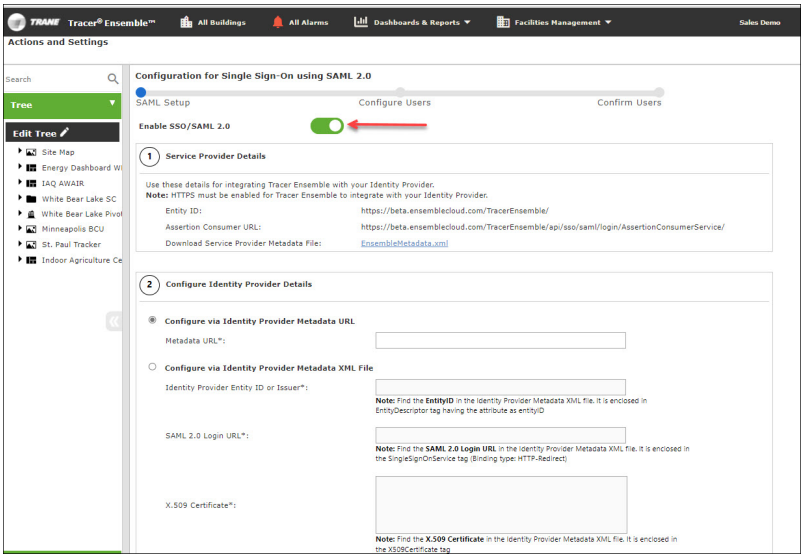


Configuration

To configure SAML:

1. Select **Actions and Settings** from the top right banner.
2. Under System, click **SAML 2.0 Configuration**.
3. On the Configuration page, select the toggle switch to enable SAML SSO.

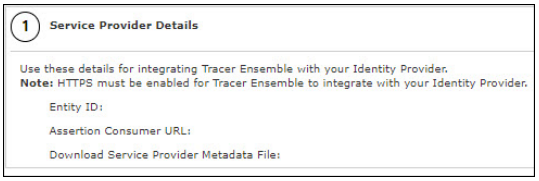
Figure 13. Enable SAML SSO



4. In Section 1:
   a. Note the Service Provider Details (Entity ID, Assertion Consumer URL, and Service Provider Metadata File). You will need these details to integrate Tracer Ensemble with your Identity Provider (for example, Ping Identity, Okta, Azure).
   b. Select **EnsembleMetadata.xml** to download the Metadata file.

Note: *HTTPS must be enabled for Tracer® Ensemble to integrate with your Identity Provider.*

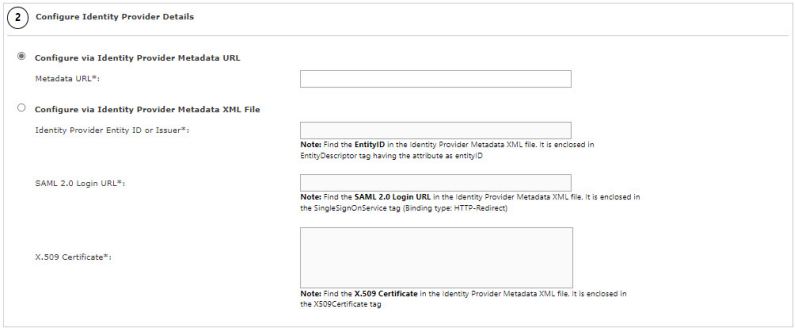
Figure 14. Service Provider Details



5. In Section 2, configure the Identify Provider details. The required information will come from your Identity Provider (for example, Ping Identity, Okta, Azure). Select:

- Identity Provider Metadata URL.
- Identity Provider Metadata XML File.

Figure 15. Configure Identity Provider Details



6. In Section 3, specify the email domain(s) that should be allowed to authenticate via your Identity Provider. Public domains (such as gmail.com, outlook.com) are not permitted. Your organization may have one or more email domains applicable. (such as, tranetechnologies.com; trane.com).

   To add an email domain, enter the email domain and click **Add**.

Figure 16. Add Email Domains

7. Click **Next**.
8. The Configure Users screen displays active Ensemble users that either:

- Do not have an email address associated with their Ensemble user account
- Do not have an email address that matches the email domain(s) that were entered on the previous step.

  To allows any of these users access to Ensemble via SAML Single Sigh-On authentication, you must either:

  - Add an email address with an email domain that matches the email domain(s) that were entered on the previous step.

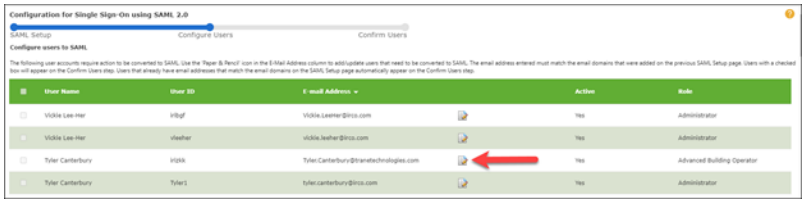
- Update the existing email address with an email address that matches the email domain(s) that were entered on the previous step.

Note: *Most likely you will have Ensemble user accounts such as Trane technicians, Trane administrator account, and other contractors who will not authenticate via SAML Single Sign-On authentication. They are not employees of your organization and will not have email addresses with email domains that match your organization. These users will continue to login to Tracer Ensemble via their existing credentials.*

Figure 17. Configure Single Sign-On

a. To edit a user account and update the email address, click **Edit** in the E-mail Address column.

Figure 18. Edit user account



b. Make the necessary update and click **Save**.

Figure 19. Save changes

c. Scroll to the bottom of the page and select **Next**.

9. The Confirm Users screen displays all Ensemble user accounts that have an email address with an email domain that matches the domain(s) provided.

   a. Review the user list to ensure all user accounts listed are users that you want to authenticate via SAML Single Sign-On authentication.

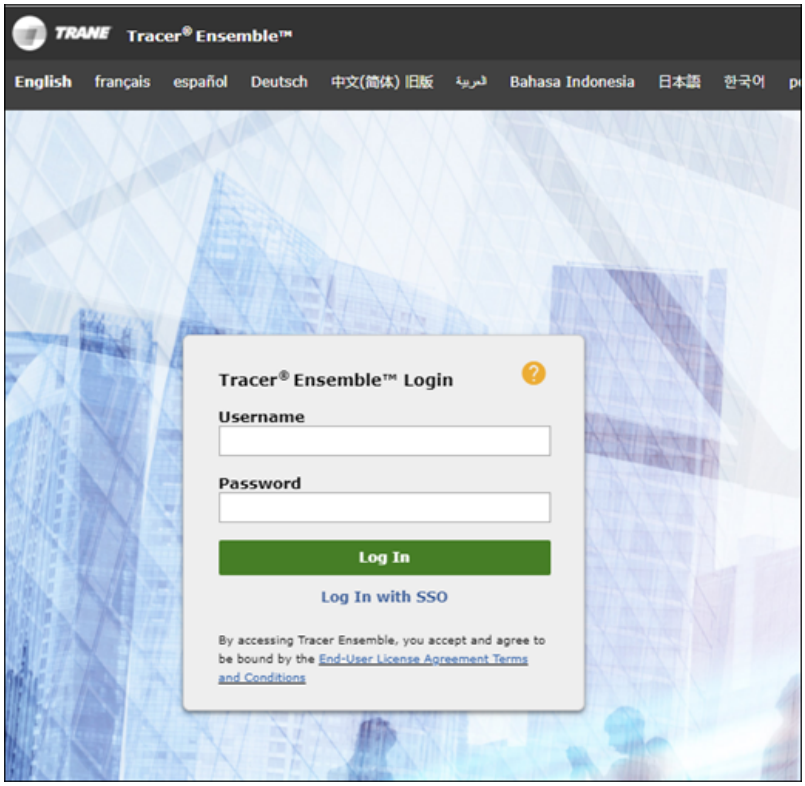
Figure 20. Confirm Single Sign-On accounts

b. Once the review is complete, select **Finish**. The Success screen displays.

Figure 21. SAML setup success screen

10. Once SAML configuration is successfully completed, users that were selected to sign in via SAML Single Sign-On authentication will enter their company email address and company domain password on the Log In screen.

Figure 22. Tracer® Ensemble log in screen

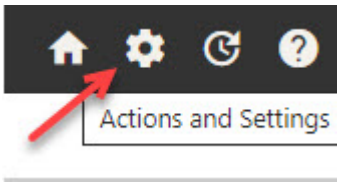


Adding New Users to SAML

To add new Tracer® Ensemble SAML users after initial SAML Configuration is complete:

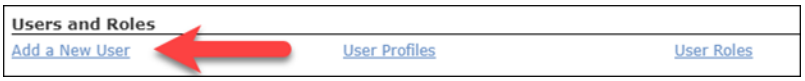
1. Select **Actions and Settings** from the top right banner.

Figure 23. Actions and Settings



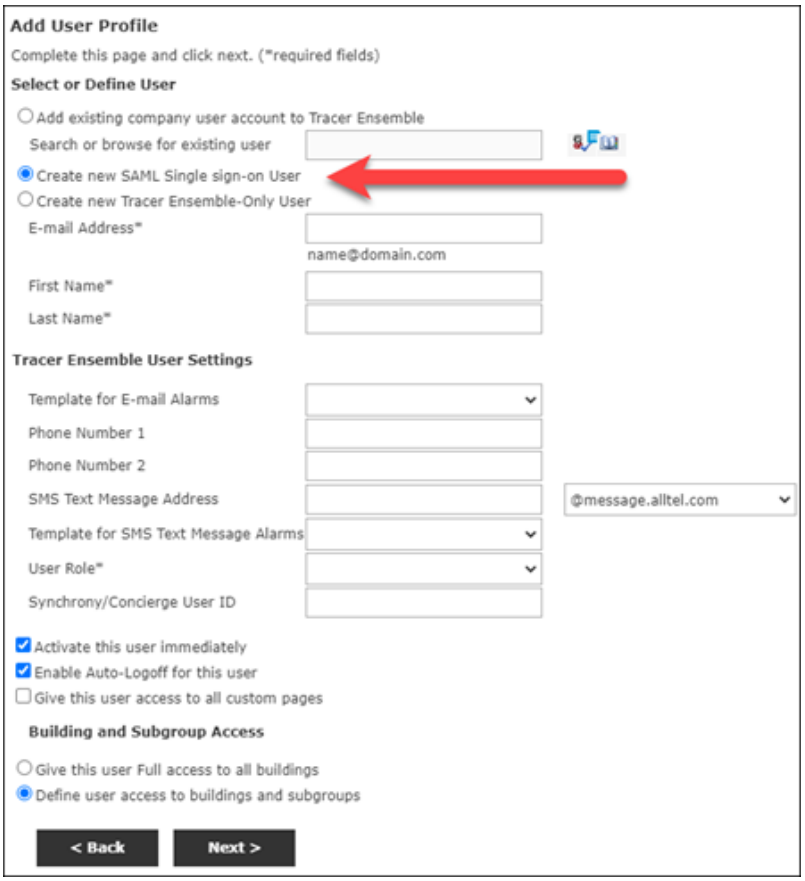
2. Select **Add New User**.

Figure 24. Add New User



3. Select **Create new SAML Single sign-on User**.

Figure 25. Create new SAML Single sign-on User



4. Click **Next**.
5. Complete the User Profile setup. Once completed, the user will have an Ensemble user account configured as an SAML User.

Updating Tracer® Ensemble

Complete this procedure if you are installing Tracer® Ensemble software on a system that already has Tracer Ensemble V2.5 or higher installed. If Tracer Ensemble is older than V2.5, it must be upgraded to V2.5 before upgrading to the current version. The installation program will automatically make changes to a previous version of the Tracer Ensemble database to make it compatible with the latest version of the software.

Note: *Tracer Ensemble v4.6+ uses a new license file format which requires a valid Software Maintenance Plan (SMP) license in order to upgrade. A valid license file is required before Tracer Ensemble installer will perform the upgrade.*

To upgrade Tracer Ensemble:

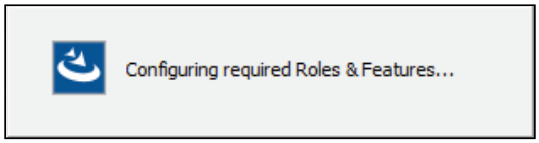
1. Copy the Tracer Ensemble installation media to a defined location on the workstation.
2. The installer will determine if the correct .Net Framework is installed. If the correct version is not installed, the Tracer Ensemble installer will download and initiate the .Net Framework installer.

   Note: *If Internet access is not available to the server, a manual download and installation of .Net Framework is required. Tracer Ensemble 4.7+ will not install if the correct framework is not in place.*

   a. When prompted, install the .Net Framework.

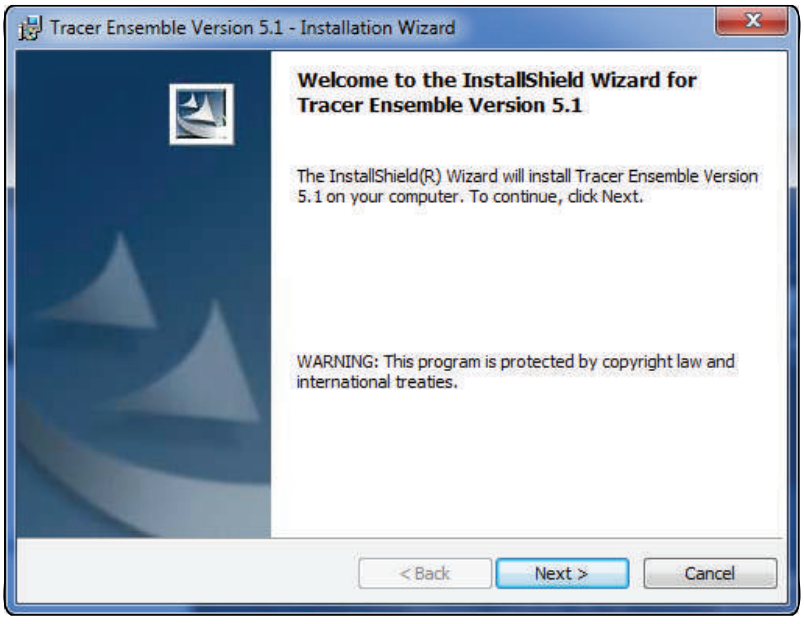
   b. Upon installation of the .Net Framework, the Tracer Ensemble installer will proceed with installation.

Figure 26. Configuring Roles and Features



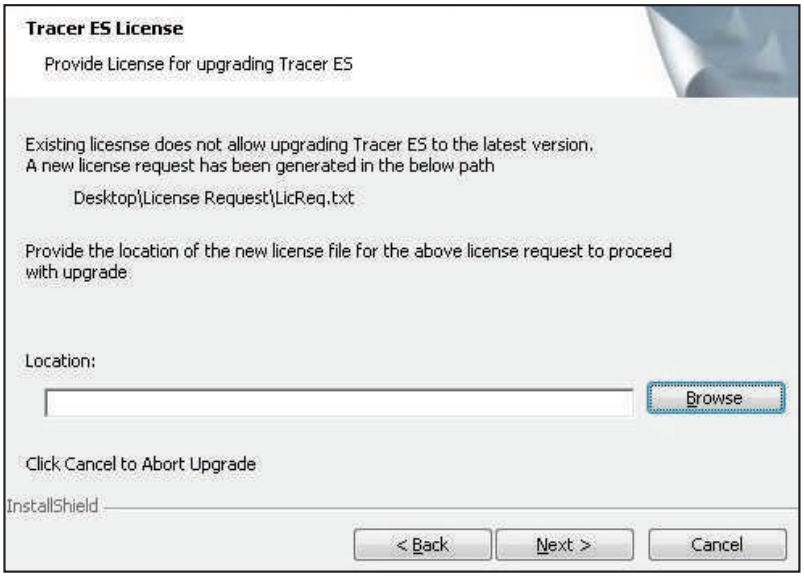
3. On the welcome screen, click **Next**.

Figure 27. Welcome



4. The installer will analyze the existing Tracer Ensemble version and license.

Figure 28. Tracer® Ensemble License



Upgrading from Tracer Ensemble v4.5 or below

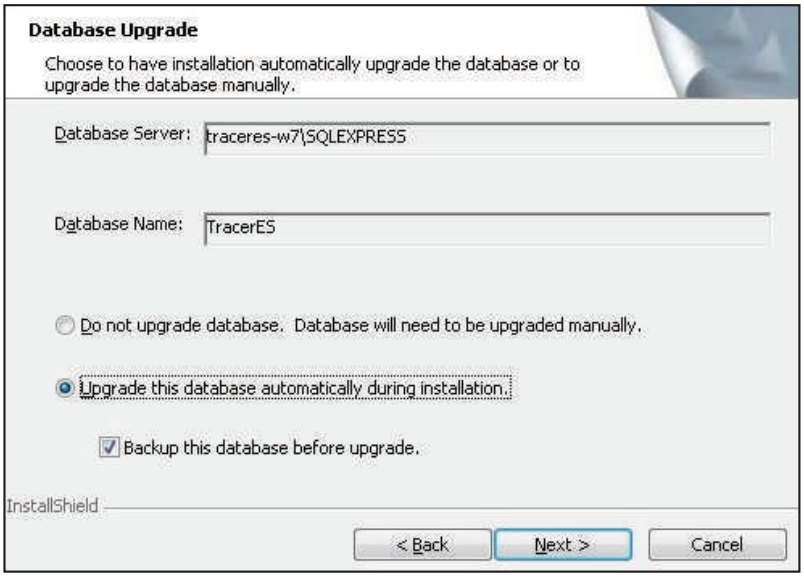
a. The installer will determine that the current license is incompatible with Tracer Ensemble v4.6+ and will create a new license request file and saved it the desktop. The installer will not install Tracer Ensemble 4.6+ until a valid license is obtained.
b. Using the newly created license request file and the Tracer Licensing page, update the existing license with the new Server ID using the Change Hardware path on the licensing server.
c. Using the Tracer Licensing page, update the license with an appropriate Software Maintenance Plan.
d. Save the update license.
e. Re-run the installer if cancelled.
f. When prompted, upload the new license file.

Upgrading from Tracer Ensemble 4.6+

a. The installer will determine if the current license has a valid SMP.
   - If a valid plan is detected the installer proceed to Step 6.
   - If an invalid SMP is detected a new license request file and saved it the desktop. The installer will not install Tracer Ensemble 4.6+ until a license with a valid SMP is detected.
b. Using the Tracer Licensing page, update the license with an appropriate Software Maintenance Plan.
c. Save the update license.
d. Re-run the installer if cancelled.
e. When prompted, upload the new license file.

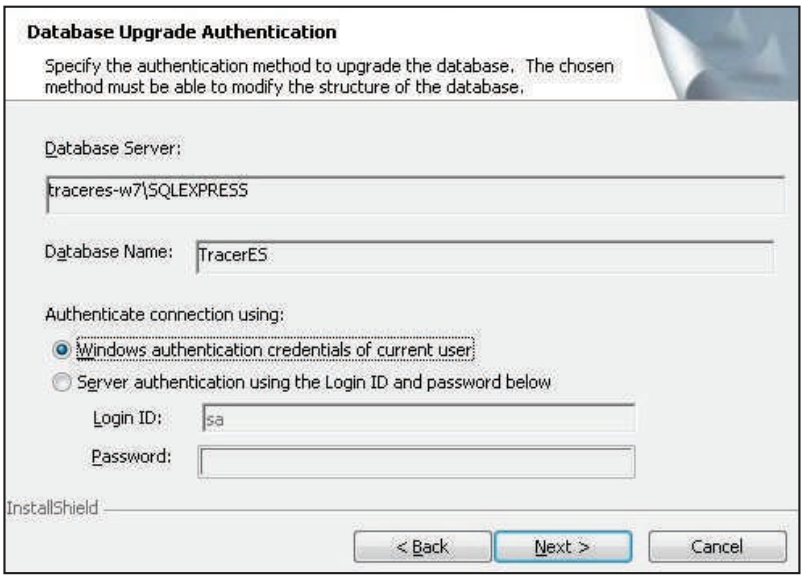
5. On the Database upgrade screen, verify the following:
   - Database server name.
   - Database name. This is typically **Tracer Ensemble**, but may vary.
6. Select the method for upgrading the database:
   - Select **Do not upgrade the database** if you are updating the database manually. This option is typically used if the database is managed by an SQL DBA or another user.
   - Select **Upgrade the database** if you want the installation program to automatically update the database to the current version.

Figure 29. Database Upgrade



7. Select your SQL authentication method:
   - Select **Windows Authentication...** to use your Windows login credentials to authenticate your access to the Tracer Ensemble database. Choose this option if you are typically able to make changes to the database structure without needing to login using a different administrator account.
   - Select **Server authentication...** and then specify the **Login ID** and **Password** to login in to the database. Choose this option if you need a different administrator account to make changes to the database.

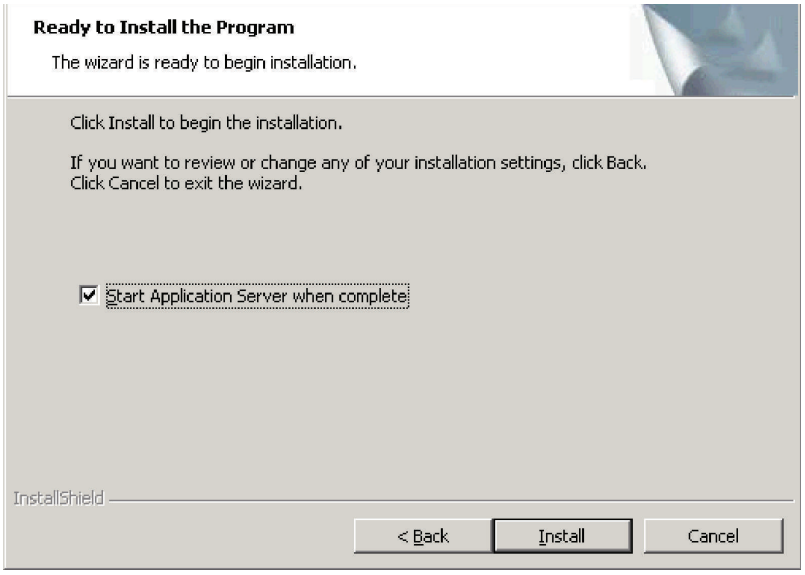
Figure 30. Database Upgrade Authentication



8. On the Ready to Install screen, select the appropriate options:
   - Select **Start Application Server when complete** if you want Tracer Ensemble to run immediately after the installation is complete.

- Clear **Start Application Server when complete** if you prefer to start the server manually after installation.

Figure 31. Ready to Install



9. When the InstallShield Wizard Complete screen displays, click **Finish.**

Note: *If the installation process fails for any reason, the Tracer Ensemble Installer will roll back any file system changes made. IIS will need to be manually reconfigured to use the .NET 2.0 Framework if this happens.*

Advanced Configurations and Functions

Windows Services

Windows provides functionality to start and stop services that are running on the server. Tracer® Ensemble runs as a services and can be started, stopped, or restarted.

To start or stop the service:

1. Click **Start**, and then click **Control Panel**.
2. Double-click **Administrative Tools**.
3. Double-click **Services**.
4. Select **Trane Tracer Ensemble Application Server** service.
5. Look in the Status column to determine whether or not the service is running.
   - Started means the service is running.
   - Stopped means the service is not running.
6. Choose an action:
   - To start the service, on the **Action** menu, click **Start**.
   - To stop the service, on the **Action** menu, click **Stop**.
   - The service may require several minutes to start or stop completely.

HTTPS and SSL – Secure Communications Configuration

The following procedure is necessary only if you require secure communications on the Tracer® Ensemble website, specifically HTTPS. If you do not require secure communications, you should use the standard HTTP connection established by the installation program and IIS configuration on the Microsoft Server.

The following steps are involved when configuring HTTPS on the Microsoft Windows Sever:

1. Obtain a certificate.

   Before proceeding, you must obtain a server certificate. There are two parts to this step. You must generate a certificate request, then obtain the actual certificate. Generating a certificate request is not a part of Tracer Ensemble, but rather a part of the Microsoft Server that Tracer Ensemble is installed on. The certificate request generation will differ slightly depending on the Microsoft Windows Server Platform on which you are installing it.

   There are many certificate vendors and videos to aid customers through this process:

   - https://www.youtube.com/watch?v=OIx5kg0YK7U
   - https://www.godaddy.com/help/ssl-certificates-1000006
   - https://www.digicert.com/csr-creation.htm

   After you have the Certificate Request, there are multiple ways to obtain a certificate. One method is to obtain a trusted certificate through a trusted certificate vendor.

   Examples of Trusted Certificate Vendors are:

   - www.verisign.com
   - www.godaddy.com

   You can also create a self-signed certificate; however, the process for this will depend on the Microsoft Windows Server Operating System Platform you are using and what version of IIS is running.

   Microsoft Corporation provides documentation on how to do this for each version:

   - https://support.microsoft.com/en-us/help/228991
   - https://msdn.microsoft.com/en-us/library/ff699202.aspx
2. Install the certificate.

   The installation method will vary depending on your web server and the type of certificate you

purchase. Specific installation instructions, resources, and support are typically offered by your certificate provider or your web host.

Below are links to Trusted Certificate Vendors instructions on installing their certificates:

- https://www.godaddy.com/help/ssl-certificates-1000006
- https://www.wikihow.com/Install-an-SSL-Certificate

3. Disable/redirect HTTP.

   After HTTPS is enabled on the Microsoft Windows Server Platform hosting Tracer® Ensemble, it is possible to disable/redirect HTTP traffic through the Microsoft Windows Server Platform.

   Below is a Microsoft link with instructions on this process for multiple Microsoft Server Platforms:

   - https://docs.microsoft.com/en-us/iis/configuration/system.webServer/httpRedirect/

Appendix A: Virtual Machine Requirements

For Tracer® Ensemble to be licensed correctly, the processor signature must be persisted within the server. This is CPUID EAX=1 instruction set.

HyperV Configuration

HyperV Virtual server must be configured with Processor Compatibility mode enabled. This obscures the CPUID instruction set allowing Tracer® Ensemble licensing to remain operational upon migration or restart.

VMware ESX(i)

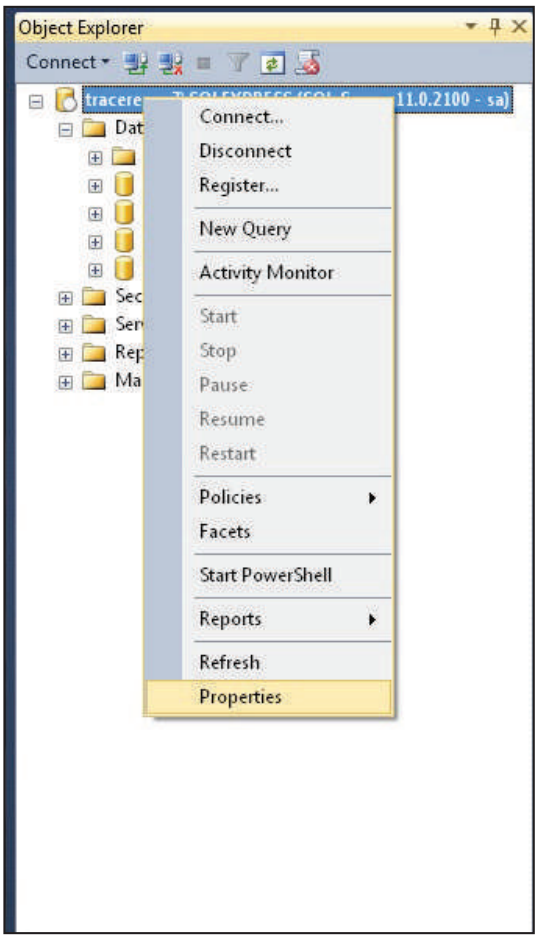
VMWare virtual machines must have the CPUID leaves configured to persist the EAX within the virtual machine configuration file.

Appendix B: Advanced SQL Configuration

If it is determined that the SQL server is consuming most or all of the memory of the server that SQL and Tracer® Ensemble is installed on, follow these steps to limit the amount of memory that the SQL Server can use.

1. Open SQL Management Studio, right click on the SQL Server, and select **Properties**.

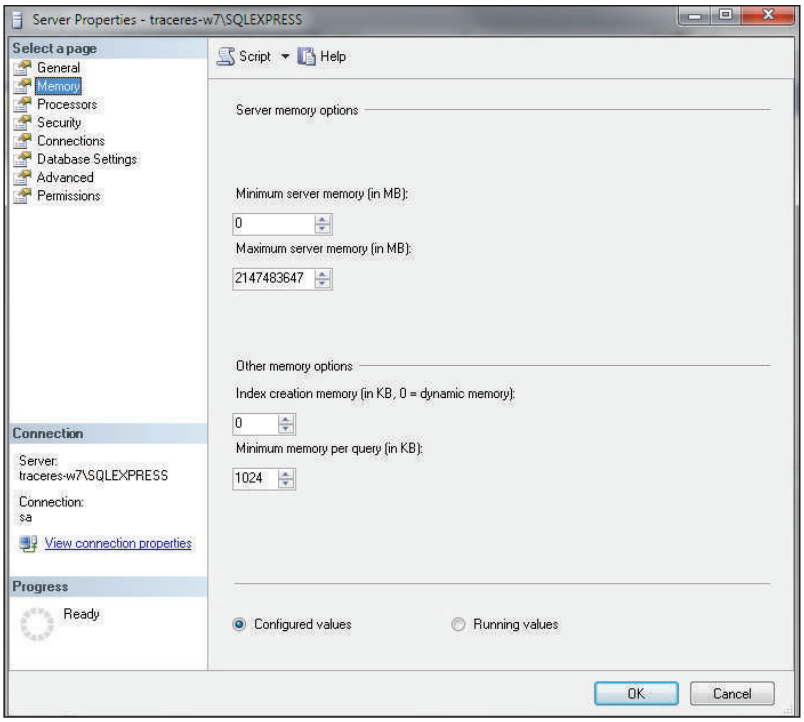
Figure 32. Select SQL Server Properties



2. Select **Memory** and set the Maximum server memory to XXXX MB to limit the SQL server memory consumption to your specified limit.

   Note: *Determining what to limit the SQL Servers memory consumption will need to be done on an installation by installation basis.*

Figure 33. SQL Server Properties



3. Click **OK**.
4. Restart SQL for the changes to take affect.
5. Restart Tracer Ensemble to reinitialize the connection to the SQL database.

Appendix C: Backup and Restore

Backup

A disaster recovery solution for Tracer® Ensemble systems server should be identified and executed on a customer agreed upon basis. Typically either an automated or manual backup of Tracer Ensemble files and database is required to accomplish this. There are numerous software solutions available at all cost points to accomplish an automated backup solution. Talk with an industry professional to select the best solution for your application.

The following files and databases are critical to Tracer Ensemble and need to be backed up:

SQL Database

- Tracer Ensemble database
- Primary database (used in extreme disaster recovery circumstances)

Tracer Ensemble files

- <drive path>/Trane/TracerES/Server/bin/trane.OWS.server.exe.config
- <drive path>/Trane/TracerES/Server/metadata/administration/license/lic.dat
- <drive path>/Trane/TracerES/UI/Web.config
- <drive path>/Trane/TracerES/UI/Custom Applications
- <drive path>/Trane/TracerES/UI/Graphics

Restore

The backup files identified above are required to restore a Tracer® Ensemble system to the previous state. Examples of when you need to restore Tracer Ensemble include when the operating system (OS) for your Tracer Ensemble server has been reinstalled, when the Tracer Ensemble server is moved to new hardware, or a Virtual Machine is created for Tracer Ensemble. The process to restore Tracer Ensemble is the same for each situation.

To restore Tracer Ensemble:

1. Using SQL management studio restore the Tracer Ensemble database.
2. Identify the Tracer Ensemble version to install on the new server.
   a. After the Tracer Ensemble database has been restored, expand the database folder, Tracer Ensemble database and tables.
   b. Locate the dbo.ApplicationVersion table, right click, and select top 1000 rows.
   c. Note the application version (last row is the current version of software from backup).
3. Install the Tracer Ensemble version identified in step 2 for proper restore.
   a. Select Install Tracer Ensemble only.
   b. Populate the database information with the restored Tracer Ensemble database name and user credentials of the SQL server.
   c. Do not start Application Server after installation is complete.

   Note: *If an upgrade is desired at this time we recommend restoring the Tracer Ensemble system, verify operation and then proceed with a software upgrade.*
4. Copy the following files to the Tracer Ensemble installation location:
   - <drive path>/Trane/TracerES/Server/bin/trane.OWS.server.exe.config
   - <drive path>/Trane/TracerES/UI/Web.config
   - <drive path>/Trane/TracerES/UI/Custom Applications
   - <drive path>/Trane/TracerES /UI/Graphics
5. Start Tracer Ensemble.
6. Log in o Tracer Ensemble. Navigate to Actions and Settings | **Tracer Ensemble Licensing**.
7. Click **Register Site License**.

8. All information should be populated. Licensing information cannot be changed during this process. If it is not populated, populate the required fields and click **Next**.
9. Download a new license request file to update the Server ID within the Trane licensing system.
10. See Updating Tracer Ensemble for updating license server ID.
11. Download new license from Trane licensing system. Upload new license to Tracer Ensemble.
12. Navigate to Actions and Settings | **Tracer Ensemble Licensing**.
13. Click **View Panel Licensing**. Activate panels that were deactivated during the restore process.
14. Verify communications is restored to system panels.
15. Verify operation of Tracer Ensemble system.

Appendix D: Direct Link with Tracer SC

Direct link allows Tracer® Ensemble users to access the Tracer SC user interface from links within Tracer Ensemble without requiring an additional log on to Tracer SC. These links are created and displayed for buildings with Tracer SC V3.1+. Both Tracer Ensemble and Tracer SC must be configured for direct link access.

Direct Link Requires:

- Tracer Ensemble V3.5+.
- Tracer SC V3.5+ (high performance user interface).

Single Sign On for Direct Link Requires:

- Tracer Ensemble V4.0+.
- Tracer SC V3.5+ (high performance user interface).

Configuring Tracer SC for Direct Link

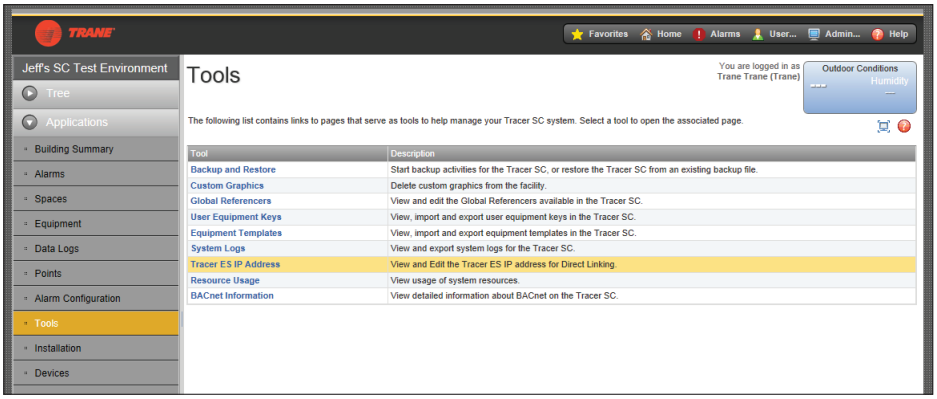
1. Log in to the Tracer® SC user interface via the Tracer SC application or Tracer Ensemble direct link.

Figure 34. Tracer® SC Login Page

Figure 35. Access Tracer® SC via Tracer® Ensemble Direct Link

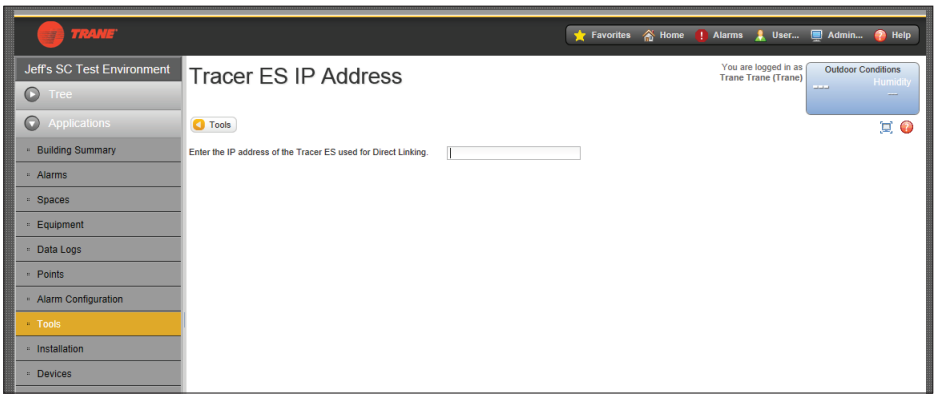
2. Click on **Tools**.
3. Double click on **Tracer Ensemble IP Address**.

Figure 36. Tracer® Ensemble IP Address



4. Enter the IP address of the Tracer Ensemble server.

Figure 37. Tracer® Ensemble Server IP Address



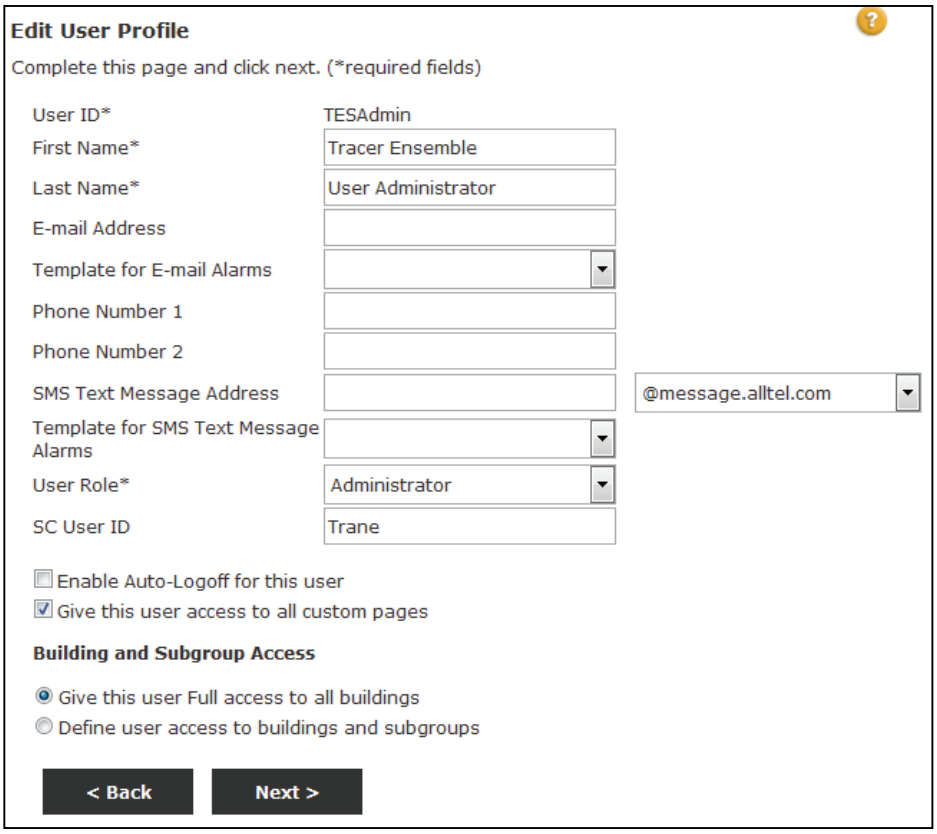
5. Click **Save**.

Note: *This process must be repeated for every Tracer SC that you want to access from Tracer Ensemble for single sign on to work. This is not required for direct links from Tracer Ensemble to function properly, but users will need to log on to Tracer SC when accessing it from Tracer Ensemble if not set up correctly.*

Configuring Tracer Ensemble for Direct Link

1. In Tracer® Ensemble, click the **Actions and Settings** icon.
2. Click **User Profiles**.
3. Click the appropriate user name.
4. Click **Edit Profile**.
5. In the **SC User ID** field, enter the Tracer® SC user name.

Figure 38. Edit User Profile



6. Click **Next** and then **Finish** to save your changes.

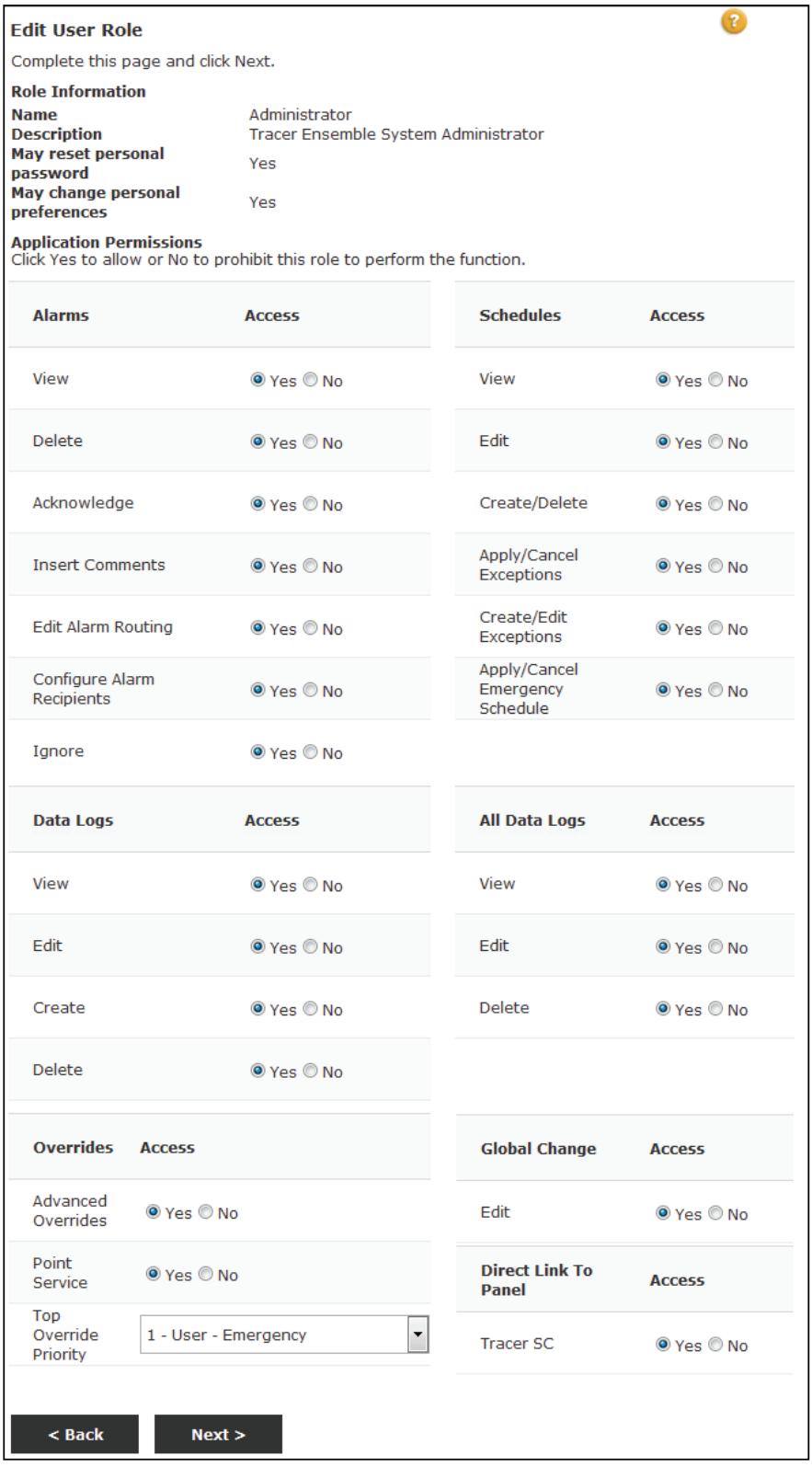
Note: *If you edited your own user profile, you will be prompted to log in again, as your security settings have changed.*

User Access to Direct Links

You can optionally allow or deny users access to direct links to Tracer® SC based on their user role.

1. In Tracer® Ensemble, click the **Actions and Settings** icon.
2. Click **User Roles**.
3. Select the role that you want to edit.
4. Click the **Edit** button.
5. Click **Next** through the wizard until you reach the **Application Permissions** page.
6. Set the access level direct links to Tracer SC in the **Direct Link to Panel** section. **Yes** will display Tracer SC links for users with this role and **No** will hide the links.

Figure 39. Edit User Role



7. Save your changes.

Trane - by Trane Technologies (NYSE: TT), a global innovator - creates comfortable, energy efficient indoor environments for commercial and residential applications. For more information, please visit trane.com or tranetechnologies.com.

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